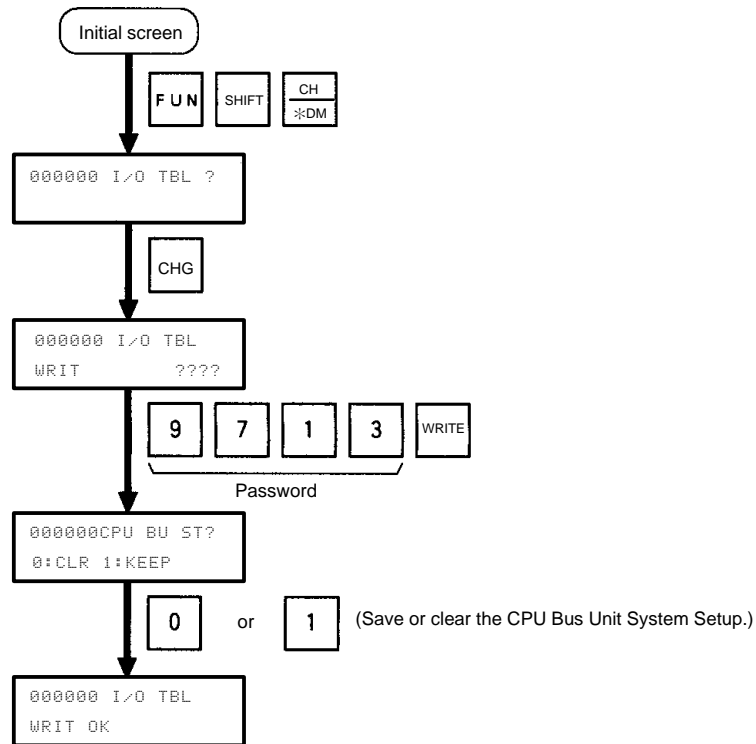


Use the following procedure to create the I/O table.



3-8 Creating Routing Tables

When the FINS communications service is used, routing tables must be created in advance. Routing tables are required in the following circumstances.

- When the FINS communications service is used on an Ethernet network (including when communications are only carried out between FA networks via an Ethernet network).
- When there are multiple Communications Units mounted to the PC, and socket services are requested by executing the CMND(490) instruction.

If neither of these circumstances apply, then a routing table is not required. In that case, proceed to *3-9 System Setup*.

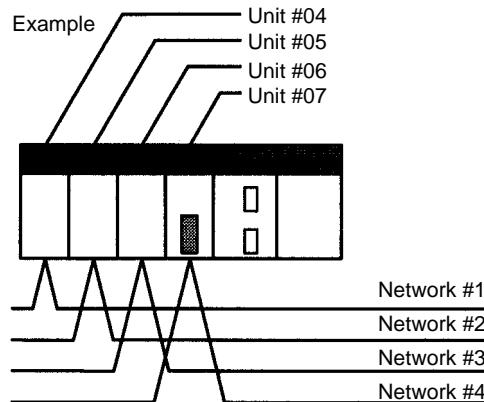
The routing table is required not only for nodes communicating via the FINS communications service but for all relay nodes on the network.

3-8-1 Routing Table Overview

The routing tables describe the transmission path for FINS messages when the FINS communications are used. It consists of two tables: A local network table and a relay network table.

Local Network Table

The local network table is a table describing the correspondences among unit numbers of the Communications Units and Boards mounted to each node (PC or FA Computer).



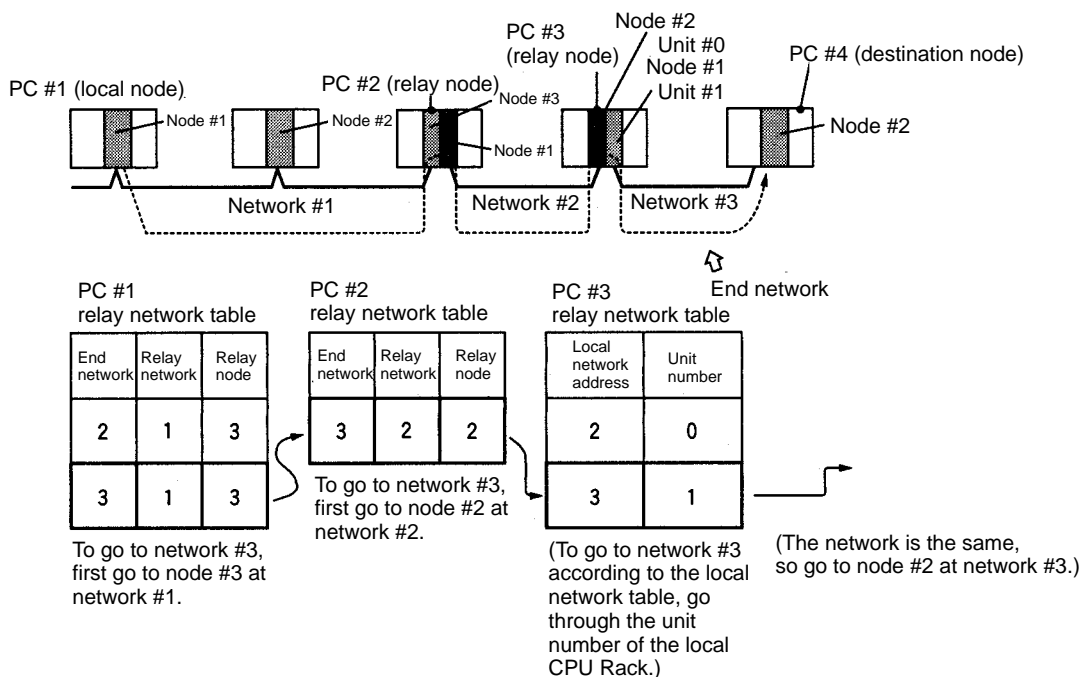
Local Network Table	
Local network address	Unit number
1	04
2	05
3	06
4	07

- Note**
1. The unit number is set (from 0 to F: 1 to 15) by the rotary switch on the front of the Ethernet Unit.
 2. The network address is the number of the network (from 1 to 127) to which the Communications Unit or Board is connected. It is set when the local network table is created.

Relay Network Table

A relay table is a table that shows the nodes to which data should be sent first in order to send data to a network that is not connected to the local node. It shows the correspondence between the address of the final destination network, and the network address and node number of the first relay point of the path to reach there. When internetwork communications are carried out, the end network can be reached by following the relay points.

The following example shows a routing table for sending data from PC #1 (the local node: network address 1, node number 1) to PC #4 (the destination node: network address 3, node number 2).



3-8-2 Connecting and Using a Peripheral Device for the PC

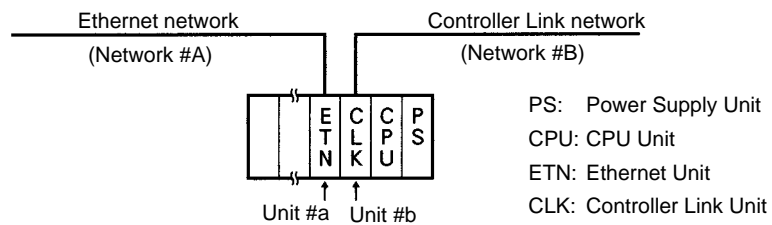
Routing tables must be created by a CX-Programmer connected to the PC. (They cannot be created using a Programming Console.) For details on how to connect and use a CX-Programmer, refer to the *CX-Programmer User's Manual*.

- Note**
1. To transfer routing tables for multiple nodes to a PC in one batch, connect the CX-Programmer to a PC with only one Communications Unit mounted. Routing tables cannot be transferred to other nodes from a PC with multiple Communications Units mounted.
 2. Routing tables can only be transferred as a batch to multiple nodes within the same network as the PC to which the CX-Programmer is connected.

Routing Table Setting Examples

Example 1: Local Network Table for a PC With Multiple Units Mounted

This example shows the local network table settings for a PC to which multiple CPU Bus Units are mounted.

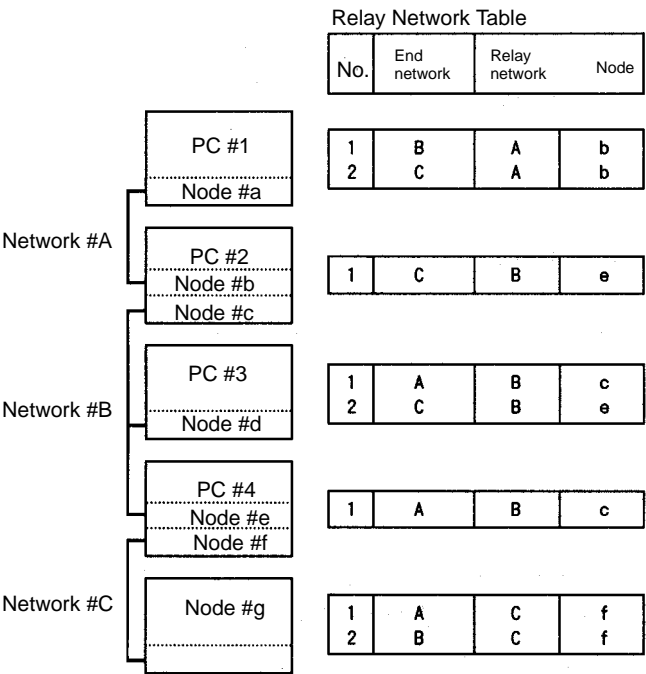


Local Network Table

No.	Local network	CPU Bus Unit
1	A	a
2	B	b

Example 2: Three Interconnected Networks

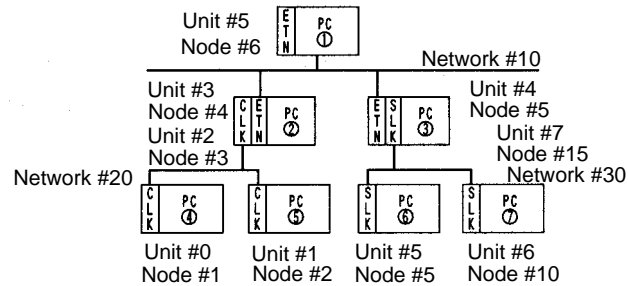
This example shows the relay network table settings for three different interconnected networks.



In the table for PC #3, for example, if network #A is taken as the end network, then network #B becomes the relay network and node #c becomes the relay node. If network #C is taken as the end network, then network #B still becomes the relay network and node #e becomes the relay node.

Example 3: All Nodes

This example uses the following configuration to show the routing tables for all nodes.



PC #1 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	010	05
2		
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	020	010	004
2	030	010	005
3			

PC #2 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	010	03
2	020	02
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	030	010	005
2			
3			

PC #3 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	010	04
2	030	07
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	020	010	004
2			
3			

PC #4 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	020	00
2		
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	010	020	003
2	030	020	003
3			

PC #5 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	020	01
2		
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	010	020	003
2	030	020	003
3			

PC #6 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	030	05
2		
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	010	030	015
2	020	030	015
3			

PC #7 Routing Table
(Local network table)

No.	Local network	CPU Bus Unit No.
1	030	06
2		
3		

(Relay network table)

No.	End network	Relay network	Relay node
1	010	030	015
2	020	030	015
3			

3-9 System Setup

The settings for the Ethernet Unit's basic and special functions are made in the CPU Bus Unit System Setup. These settings, and the situations in which the settings must be made, are shown in the following table. For details on how to make the settings, refer to *4-2 CPU Bus Unit System Setup*.

3-9-1 When Settings are Required

Settings	When settings are required
Broadcast setting	When Ethernet is used with UNIX 4.2BSD specifications.
Address conversion method	<ul style="list-style-type: none"> When the FINS communications service is used on an Ethernet network. When it is necessary to set a value outside of the range of 1 to 126 for the least significant byte of the local IP address.
UDP port number for FINS	When it is necessary to set a value other than the default (9600) for the FINS UDP port number.
Subnet mask	When it is necessary to set a subnet mask.
FTP login name FTP password	When setting the login name and password at the FTP server.
IP address table	<ul style="list-style-type: none"> When the FINS communications service is used on an Ethernet network. When it is necessary to set a value outside of the range of 1 to 126 for the least significant byte of the local IP address.
IP router table	<ul style="list-style-type: none"> When the Ethernet network is configured with multiple segments.
Mail function	When the mail function is used.

Refer to *4-2 CPU Bus Unit System Setup* for details.

3-9-2 Using a Programming Device

The settings for the CPU Bus Unit System Setup must be made by a CX-Programmer connected to the PC. The settings cannot be made using a Programming Console. For details on how to connect and use a CX-Programmer, refer to the *CX-Programmer User's Manual*.

3-9-3 CPU Bus Unit System Setup Defaults

The following table shows the items in the CPU Bus Unit System Setup, and their default settings.

Item	Default
Broadcast settings	All 1 (4.3BSD specifications)
Address conversion method	Automatic address generation
UDP port number for FINS	9600
Subnet mask	0.0.0.0 (A value corresponding to the IP address is used.)
FTP login name	CONFIDENTIAL
FTP password	Not set.
IP address table	Not set.
IP router table	Not set.
Mail settings	None set.
User-created mail data address	Not set.
Local mail address	Not set.
Destination mail address	Not set.
SMTP server address	0.0.0.0 (Not set.)

For information on IP address table settings, refer to *3-10 Creating an IP Address Table*. For information on IP router table settings, refer to *3-11 Creating an IP Router Table*. For information on IP mail transmission settings, refer to *Section 8 Mail*.

3-10 Creating an IP Address Table

An IP address table is a table of correspondences between node numbers and IP addresses, and it is used for finding IP addresses from FINS node numbers. It is necessary to register an IP address table when using the IP address table method as the method for address conversion. (For details regarding preliminary procedures, refer to *3-1 Before Operation*.)

An IP address table does not necessarily need to be registered in order to use the combined method for address conversion. If none is registered, however, the automatic address generation method will always be used.

If the automatic address generation method is to be used exclusively, then there is no need to register an IP address table. In that case, proceed to *3-11 Creating an IP Router Table*.

Connecting and Using a Programming Device for the PC

The IP address table must be created by a CX-Programmer connected to the PC. It cannot be created using a Programming Console. For details on how to connect and use a CX-Programmer, refer to the *CX-Programmer User's Manual*.

3-11 Creating an IP Router Table

An IP router table is a table of correspondences between IP router IP addresses and the network numbers of segments relayed by the IP router. If the Ethernet network is configured of multiple segments, an IP router table must be registered for communications between the segments. (For details on segments and connecting nodes, refer to *1-2-2 Node Connections*.)

If the Ethernet network has the minimal configuration of just one segment, there is no need to create an IP router table. In that case, proceed to *3-12 Checking Communications*.

Note An IP router table needs to be created only when the IP address table method or the combined method is used for address conversion.

Connecting and Using a Programming Device for the PC

The IP router table must be created by a CX-Programmer connected to the PC. It cannot be created using a Programming Console. For details on how to connect and use a CX-Programmer, refer to the *CX-Programmer User's Manual*.

3-12 Checking Communications

The Ethernet Unit supports the PING command, which is also widely supported by host computers. It also supports a function for internode testing in the FINS communications service by simply manipulating bits with a Programming Device.

After the settings and connections have been completed, use either the PING command or the internode test function as required to check communications with the remote nodes.

3-12-1 PING Command and Internode Testing

The following table outlines the points of difference between the PING command and internode testing.

Item	PING command	Internode testing
Main application	Testing communications as an Ethernet node.	Checking settings such as FINS addresses for using the FINS communications service.
Test objects	Ethernet Units and Ethernet devices that support PING.	OMRON Units and Boards that support FINS communications service internode testing.
Network classification	Within Ethernet networks (including between segments).	Up to three levels of Ethernet networks, and FA networks.
Address system used	IP addresses	FINS address system (network and node numbers) Note: Requires routing tables.
Transmission from Ethernet Unit	PING command is issued to Ethernet Unit by CMND(490) instruction in user program.	Set required parameters in DM from Programming Device, and manipulate start switch bit.
Reception at Ethernet Unit	When PING command is received, it is automatically returned.	When internode test message is received, it is automatically returned.

3-12-2 PING Command

The PING command checks communications with another node by sending an echo back request packet and receiving a response packet. Use the PING command as required to check communications. Using the PING command between nodes that support the PING command makes it possible to check whether internode communications are normal.

For details on using the PING command, refer to *9-2 PING Command*.

3-12-3 Internode Test

The internode test is a function for checking a network by sending data to and from specified nodes and checking the responses. Use the internode test as required to check the FINS communications service settings. Using it between Communications Units and Boards that support it makes it possible to check whether the FINS communications service settings are correct.

For details on using the internode test, refer to *9-3 Internode Test*.

- Note**
1. The internode test can be easily carried out by manipulating dedicated control switches for the Ethernet Unit. For details, refer to *9-3 Internode Test*.
 2. Internode testing of the FINS communications service can also be carried out by means of the FINS commands INTERNODE ECHO TEST and BROADCAST TEST RESULTS READ. For details, refer to *11-3-4 INTERNODE ECHO TEST* and *11-3-5 BROADCAST TEST RESULTS READ*.